Investigating Knowledge Exchange and Enterprise Network (KEEN) projects

A report on the methodology for research into knowledge exchange in KEEN projects funded by the European Regional Development Fund and managed by the University of Wolverhampton

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1.1 Introduction

This report describes the methodology used to evaluate the process of knowledge transfer in the Knowledge Exchange and Enterprise Network (KEEN) projects managed by the University of Wolverhampton. The projects in the KEEN programme are partially funded by the European Regional Development Fund (ERDF).

The research evaluates some of the existing approaches in the knowledge transfer literature in order to support the chosen methodology for this study. The reader's attention is drawn to some of the strengths and weaknesses in the methods utilised by previous studies of knowledge transfer.

In addition to explaining the methodological choices employed, an account is given which highlights the stages and methods used by the research team for the data collection process.

1.2 Background

Research into the interventions arising from the knowledge transfer process within university/business collaborations with SMEs (such as the KEEN programme) is extremely limited. Where research exists, it has tended to evaluate what has happened to parts of the business rather than the holistic impact of the programme across the entire organisation.

In the context of the examination of the knowledge transfer process and its infusion throughout a small company, researching this area in an SME is a complex procedure which initially appears to defy the application of a highly structured research approach. Small firms have varying mental models (Sparrow, 2000), and this hampers a common understanding of knowledge transfer processes. Issues within the transfer can be related to the unit of knowledge, or with the transfer process itself. Characteristics related to the transferee, organisational practices, or other elements may be conducive or difficult to assimilate and formulate into simple transferable and workable tasks. Such variability within and across SMEs makes a holistic study of the process of intervention difficult, which probably accounts for the relative paucity of research data. Even where there are clear systems and procedures for transferring company specific knowledge, other phenomena, both internal and external, can affect both the process and outcomes. Socially embedded actions, reactions, and activities are capable of affecting each aspect of the transfer process. To evaluate the transfer process, an interpretive approach is required in order to identify and make sense of a complex data set (Silverman, 2000; Argote et al., 2000).

As the research team was unable to locate an appropriate systematic model or framework to represent the process of knowledge transfer in the context of an SME, the team adapted the work of Szulanski (1996, 2000) to provide an underlying template for the survey. His knowledge transfer process model emanated from research into large American organisations, but it is to be expected that variables may differ in small to medium sized companies in the United Kingdom context. The researchers, in common with Lyons (2009), considered that the frameworks emerging from his study were equally applicable to companies of any size and degree of sophistication and enabled a systematic approach to the research. Of particular interest to this research project was Szulanski's four stage approach (see literature review), which allows for variations in the company's start dates and/or progress to be captured in a coherent manner. This enables a stage by stage analysis of the knowledge transfer process and a comparison against objectives with companies at a similar stage of transfer, thereby adding to the robustness of the study.

2.1 Existing Methodological Choices

Having briefly established some of the background to the topic area in Section 1.2, Section 2.1 will identify some of the existing methodological choices in the area of publicly funded knowledge transfer. The first approach to be evaluated is the quantitative methodology.

2.1.1 Quantitative Research

Quantitative research is where numerical data are collected to investigate the topic and as a result it derives meaning from the numerical data collected (Saunders et al., 2007). Furthermore, this approach is particularly useful when considering questions of numerical change or testing a hypothesis (Muijs, 2010).

Table 1 highlights those studies surveyed which have used a quantitative methodology.

Authors	Focus	Data Collection	Case Study
Szulanski (1996) (2003)	Analysis of the internal 'stickiness' of knowledge transfer.	Two-step questionnaire. First questionnaire went to 12 companies before being reduced to eight for the second phase.	Used eight firms.
Bruneel et al. (2010)	Focus on barriers to university/business collaboration (UBC) Explores how effects such as collaboration experience, breadth of interaction, and inter-organizational trust on lowering different types of barriers.	Use of large-scale survey which was sent to organisations and individuals with experience of university/business collaboration. Survey distributed in different forms to improve response rate.	None.

Table 1: Studies using quantitative methods

Quantitative studies do have some benefits over other research approaches. Firstly, as they are dealing with mostly numerical data, the results are considered to be more reliable and robust than qualitative findings, which are more open to researcher bias. Secondly, quantitative studies are able to use a large amount of data, which can be more difficult to handle in qualitative studies. In the context of the studies shown in Table 1, surveys were used to collect data from a range of different respondents.

However, a wholly quantitative approach does encounter some limitations. These include a failure to fully evaluate the social and cultural variables under investigation, as well as not addressing the 'common sense' reasoning used by participants in establishing their thoughts (Silverman, 1998). Whilst these types of studies can highlight the changes in variables under analysis, they may not provide an adequate analysis as to why the variables changed in a particular way. Hence, the 'reasoning' behind such changes is not included in the findings, and so the complete detail for the aspects under analysis is not provided. There is also a focus on theory and hypothesis testing which restricts hypothesis or theory generation (Burke Johnson and Onwuegbuzie, 2004).

2.1.2 Qualitative Methodology

Within the studies evaluated for this investigation, a more common approach has been to utilise qualitative research methods. In contrast to quantitative studies, qualitative research analyses text and images rather than numerical data (Guest et al., 2013) and therefore meaning is expressed through words. Qualitative studies involve the collection of data in a non-standardised form and as a result the data collected needs to be classified into distinct categories (Saunders et al., 2007). Thus, rather than prescribing the variables under observation in a qualitative study, unexpected variables can emerge from the research (Muijs, 2010). This creates greater richness and depth which can be used to explore the meaning of particular circumstances or events. This type of research is useful for certain topics, such as publicly funded knowledge transfer programmes, for which there is an absence of well-developed theory (Birkenshaw et al., 2011). Moreover, where a research study has multiple 'actors or 'environments' (such

as business managers, affiliates, academics, and company supervisors in a KEEN project), qualitative research is regarded as an effective tool (Sinkovics et al., 2008).

The use of qualitative research is beneficial in that respondents' insights are not constrained to a specific set of variables or questions. Respondents can be asked for their personal opinions, experiences, and suggestions in order to explore the issues under investigation. In the context of the studies shown in Table 2, Rossi et al. (2014) used this approach to capture specific issues related to the Knowledge Transfer Partnerships (KTPs) under investigation. In comparison to the quantitative investigations which made use of questionnaires, the qualitative studies in Table 2 used semi-structured interviews, observational research, or documentary evidence as part of the research study. Indeed, studies such as Rossi et al. (2014) made use of multiple qualitative methods to compare findings from different sources.

Authors	Focus	Data Collection	Case Study
Rossi et al. (2014)	Study aims to develop a framework which captures the impact of university/business collaboration based upon examining KTPs.	Based on case study approach using semi-structured interviews and documentary data. Total of 27 interviews across 14 case studies. Documentary evidence in the form of KTP reports and case studies.	Multiple (14 KTPs. In each case more than one person (academic, business partner and associate) interviewed.
Abreu et al. (2009)	Study goes further than providing analysis of patterns and structures, and highlights processes by which modes of exchange emerge, develop and are assessed.	Use of semi-structured questionnaire to conduct interviews.	Multiple case studies (33 interviews which were selected on basis of providing rich understanding, and to assess a range of different interactions (i.e. sectors).
Jones & Craven (2001)	Using the concept of absorptive capacity, the study investigates how a Teaching Company Scheme (TCS)[1] programme can develop managerial capabilities.	Two main information sources based on the academics fortnightly visits to company. The second was an affiliate acting as a participant-observer. Use of formal (MSc dissertation) and informal data.	Single (RSL manufacturing). Using the authors experience as an academic and affiliate in a TCS programme.
Spillard & Riley (1993)	Focusing on TCS programmes with a marketing element, the study highlights how the TCS scheme has evolved alongside identifying some critical success factors.	Use of data supplied by Teaching Company Directorate and the Fender Report. Use of experiences at Lancaster University.	Single (based on experiences at Lancaster University).
Lyons (2009)	Knowledge transfer process.	Interview.	Single (interview with all personnel at the firm).

Table 2: Studies using qualitative methods

[1] TCS was the forerunner to the KTP programme.

However, qualitative research has been criticised as having responses subject to personal bias, as well as being reliant on anecdotes and insufficiently scientific (Mays and Pope, 1995). Concerns have also been raised about the validity and reliability of the findings as this type of research can be subject to more bias than a quantitative approach. Another weakness of this type of research is that while the research is often conducted in a 'natural' setting (i.e. interviewing a respondent in their office), the findings can be difficult to generalise. They can be unique to the research setting under observation and so cannot be used to describe the population of units under analysis (Burke Johnson and Onwuegbuzie, 2004).

2.1.3 Triangulation: Mixed Method Research

A third methodological approach used in studies which have investigated publicly funded knowledge transfer is to combine both qualitative and quantitative methods. This strategy is known as mixed method research, and such approaches have become more common across a range of different fields in recent years (Bryman, 2006). Through using multiple methods, greater insight into a topic can be generated as different elements can be investigated due to the additional range of research methods used. Moreover, Saunders et al. (2007) note that the use of multiple methods can provide a better opportunity to answer the research question set. Furthermore, Bryman (2006) argues that using both methods can increase the likelihood of unexpected outcomes being generated in the research.

A further advantage of using mixed methods research is that it can help to create greater robustness and validity in the findings (Collis and Hussey, 2003). In this context, the findings from qualitative approaches (which can be subject to personal bias) can be compared to the findings from quantitative methods (which are subject to less personal bias). Therefore, if a researcher has unwittingly biased the findings of the qualitative data, the results from the quantitative analysis can highlight these areas. This approach is known as triangulation and, for example, it enables the findings from an interview to be compared with the findings from a survey.

Triangulation does not only relate to the type of methods used in the study. As this study is being completed by a team of researchers, a form of 'investigator triangulation' is present in the study. As there is a team of researchers, data on the same phenomenon is collected by several individuals. These results can then be compared (Collis and Hussey, 2003) to reduce any personal bias involved in the data collection. This can help to create more reliability and validity in the results.

In both of the studies in Table 3, a range of different respondents were included in the interview or qualitative data collection process. These respondents included academics, affiliates, companies, and managers involved in the knowledge transfer process. Other studies such as that by Rossi et al. (2014) also use a similar range of respondents, but the scale of these two studies is far greater. In this case, the use of quantitative data to support the qualitative findings is particularly beneficial. The quantitative aspect of research was conducted, first, with the qualitative data collected after an initial analysis of the quantitative material was completed.

Authors	Focus	Data Collection	Case Study
Ternouth et al. (2012)	Investigates KTP from the specific perspective of addressing how partners, delivery mechanisms, and other processes work to deliver successful outcomes.	Quantitative (multivariate analysis of 4,600 KTPs) Qualitative (open-ended and semi-structured interviews: 60 in total. Further consultation interviews with funders, KTP offices, assessors, and advisors.	30 projects in total. Interviews with, at least, one associate, academic or company.
Davey et al. (2011)	European wide. Study charted current situation regarding university/business collaboration (UBC). Describes factors which facilitate or inhibit UBC, and identifies good practice.	Documentary (such as published reports), ten 'expert' interviews, further 12 'experts' involved in focus group study. Survey sent to over 11,000 people involved in UBC (academics and HEI managers) with 6,280 returned.	30 good practice UBC cases selected.

Table 3: Studies using mixed methods

3.1 Case Study Research

Tables 1 to 3 suggest that case study research is a commonly used approach within the literature on publicly funded knowledge transfer programmes. Case studies provide a method of developing theory by offering unique in-depth insights into a particular phenomenon under investigation (Dubois and Gadde, 2002). Moreover, this approach enables a rich collection of data. As the research into the process of knowledge transfer has been limited, the use of a case study approach will help to provide an exploratory analysis of the issues.

An important feature of case study research is the number of cases which will be selected for the analysis. According to Pauwels and Matthysens (2004), the number of cases selected does not impact upon the quality of the analysis, but many of the studies in the area of publicly funded knowledge transfer have been based on the analysis of multiple cases (see Tables 1 to 3). However, both Jones and Craven (2001) and Spillard and Riley (1993) used a single case analysis. A single case analysis can be used to represent an extreme case or a typical situation (Saunders et al., 2007), while a multiple case analysis, such as the method used by Ternouth et al. (2012) or Rossi et al. (2014), can establish whether the findings from one case are reflected in the results of another case (Saunders et al., 2007). In a multiple case analysis, the case studies can be selected on the basis of maximum variation (Flyvbjerg, 2006). This creates a wider range of instances under observation, and has been used in other fields such as foreign investment and football (e.g. Jones, 2014). However, depending on the sampling framework, these cases may not always be representative of the population. In the study by Abreu et al. (2009), it was stated that the cases selected were not chosen on the basis of the structure of British industry.

4.1 Conducting the Research

Having assessed the existing methodologies in the topic area, Section 4.1 will now identify the methodology to be utilised in this study. To ensure that robustness and validity can be maintained in the results, this investigation used a mixed method approach to data collection. This involved the collection of both quantitative and qualitative data through the design of a survey, the interview protocol, and the collection of documentary data, which includes application forms, project review meeting minutes, and other relevant documents such project plans. Alongside these data collection methods, the research team also produced six case studies which highlighted some of the issues present in the knowledge transfer process, as well as some lessons which can be learned from the KEEN programme.

4.1.1 Survey

The first phase of the primary data collection process was to design and distribute a survey to be administered to the four main groups of participants in the KEEN programme (lead academics, affiliates, company supervisors, and business development managers). A different version of the survey was sent to each of these groups, although some questions (such as those investigating the spread of knowledge, methods of knowledge transfer, and sustainability) were common across all versions of the questionnaire. By adopting this approach, answers from a range of participants in the programme could be compared against each other, and specific issues related to an individual's role in the process could be addressed. Such comparisons provided triangulation between the participants and, where agreement could be found, this would strengthen the validity of the responses.

The design of the survey was completed through contributions from all the research team. This process involved the creation of several draft versions of the survey before the final version was created. The survey was designed around theoretical concepts drawn from the literature on knowledge transfer. The structure of the survey was taken from the Szulanski (1996) model of knowledge transfer, in which there are sections relating to each of the four stages (initiation, implementation, ramp-up, and integration). Other sections on the survey were: *background*, which collected attribute data such as qualifications; *before the project was started*, addressing motivation and expectations; *absorptive capacity*, which determined if the knowledge was used to generate new processes or products; and *sustainability and benefits*, which considered future planning and what the participants had gained from the project.

The survey was designed and administered through the online Survey Monkey website. The use of an online survey tool has advantages as the data for the responses are updated instantaneously (Nulty, 2008). Another advantage in terms of time is that the surveys can be distributed to the participants faster than other methods such as postal surveys (Wright, 2005). However, there are weaknesses in terms of the response rates associated with online surveys (Nulty, 2008; Saunders et al., 2007). In order to try to reduce this problem, the research team devised a message which was sent to the company contacts, business development managers, and academics. This message introduced the purpose of the survey and was sent via the Business Solutions teams at the partner universities. Saunders et al. (2007) recommends this strategy as part of gaining access to a company and establishing credibility.

4.1.2 Pilot Survey

After the completion of draft versions of the questionnaire, a pilot study took place in order to evaluate the appropriateness of the survey questions and the time taken to complete. For investigations of publicly funded knowledge transfer there is limited discussion of piloting protocols. So for this topic there is not a piloting process which can be replicated. Therefore, after an investigation of the wider literature on pilot studies, the research team elected to send the pilot out to individuals who were as similar as possible to the target population following the approach outlined by van Teijlingen and Hundley (2001). For this study, a similar population to the one under study were those individuals who participated in knowledge transfer programmes but were not participating in KEEN. Furthermore, there is no agreed number of pilot questionnaires to send out, and in total nine pilots were sent out across the four groups. This is summarised in Table 4.

Respondent	Respondents	Number
BDM	One BDM with experience of KTP. A second BDM had involvement with the KEEN programme but was on the point of retirement	2
Company	Two companies with completed KTP projects	2
Affiliate	Affiliates linked to the completed KTP projects	2
Academic	Three respondents with experience of KTP projects	3

Table 4: Pilot respondents

In addition to the questions, the respondents were also asked to confirm how long the survey took to complete, and provide additional feedback on the type of questions in the survey. Some minor changes to the questionnaire were then made on the basis of this feedback.

4.1.3 Survey Launch

Having made changes to the survey based on the findings of the pilot process, the survey was launched on 12th January to University of Wolverhampton projects. Before the launch of the survey, the introductory message was sent via email to the KEEN project companies. The introductions were sent on a university-by-university basis and gave potential respondents one week's notice prior to the launch of the survey. In cases where the Survey Monkey invitation was rejected due to an email filter, a PDF form version of the survey was made available. The stages of the survey distribution and return are highlighted in Table 5.

Date	Stage
W/C 05/01/15	Send out introductory emails to all University of Wolverhampton projects. Emails directed to project companies, lead academics, and business development managers.
W/C 12/01/15	Launch surveys for all University of Wolverhampton Projects
W/C 12/01/15	Liaise with partner universities to ensure that introductory emails are sent to Staffordshire and Aston University projects. Emails directed to project companies, lead academics, and business development managers.
W/C 17/01/15	Launch surveys for all Aston and Staffordshire University projects.
W/C 17/01/15	Send first reminder emails for University of Wolverhampton non-respondents.
W/C 17/01/15	Liaise with Coventry University to ensure that introductory emails are sent to the Coventry projects. Emails directed to project companies, lead academics, and liaison officers.
W/C 26/01/15	Launch surveys for Coventry and University of Worcester projects (excluding exceptions).
W/C 26/01/15	Send first reminder emails for Staffs and Aston non-respondents.
W/C 26/01/15	Third reminder sent to University of Wolverhampton BDMs and academics.
W/C 02/02/15	Send reminder emails to Coventry and University of Worcester projects. Telephone University of Wolverhampton non-respondents.
W/C 09/02/15	Chase Coventry projects through BDMs, launch Birmingham City University Surveys.
W/C 16/02/15	Close out Survey Responses

Table 5: Survey Process

Once a survey was distributed to an individual they were given a week to complete. Should no return have been received at this point, a reminder email was sent via Survey Monkey to remind the non-respondents. If the reminder email was unsuccessful, respondents were then encouraged through alternative means. For example, in University of Wolverhampton projects this involved telephoning the non-respondents and chasing internal staff through personal or mutual contact. At the other partner universities, business development managers or liaison officers were used to contact the non-respondents from their own projects.

In total 299 surveys were launched across the six partner universities. In designing the survey it was decided to focus on the respondent selecting a single project. Therefore, a single survey was sent to each individual, meaning those with multiple projects focused on one specific case. Additionally, some of the university partners were unable to supply contact details for those projects where the affiliate had left and the project had been terminated. In the case of Birmingham City University, some delays were encountered in sending out the survey and not all contact details were made available. The breakdown of the surveys distributed and the returns collected are shown in Tables 6 to 8.

University	Academic	Affiliate	Company	BDM	Total
Aston	3	4	4	1	12
BCU	5	5	6	2	18
Coventry	38	56	46	3	140
Staffordshire	1	1	1	1	4
Wolverhampton	24	45	40	8	117
Worcester	1	1	1	2	5
Total	72	112	97	12	299

Table 6: Distributed surveys

University	Affiliate	Academic	Company	BDM	Total
Aston	4	1	3	1	9
BCU	1	5	3	2	11
Coventry	39	23	35	2	99
Staffordshire	1	1	1	1	4
Wolverhampton	34	22	23	8	85
Worcester	1	1	0	1	3
Total	80	53	65	15	213

Table 7: Returned surveys

University	Affiliate	Academic	Company	BDM	Total
Aston	100%	33.3%	75%	100%	75%
BCU	20%	83.3%	60%	66.7%	61.1%
Coventry	69.6%	60.5%	76.1%	66.7%	69.2%
Staffordshire	100%	100%	100%	100%	100%
Wolverhampton	75.6%	91.7%	57.5%	100%	74.4%
Worcester	100%	100%	0%	50%	60%
Total	71.4%	72.6%	67%	88.2%	71.2%

Table 8: Respondents to survey by percentage

The overall response rate for the survey was 71.2%. This is considerably higher than some other examples of online surveys, for which around 30% is regarded as a typical response rate (Nulty, 2008). As expected, the majority of responses were from the University of Wolverhampton and Coventry University projects, as these two institutions had the vast majority of the KEEN projects. In total, at least one survey response was received from 96 of the projects.

4.1.4 Interview

Once the survey responses had been completed then the next phase of the data collection process was to arrange interviews with a selected number of respondents. Interviews allow for insights and a depth of information conveyed willingly by the interviewee; they allow the researcher to understand the priorities, ideas, and opinions, since the opportunity to explain and justify statements is afforded (Denscombe, 2003). Tables 1 to 3 highlight that interviews (both semi-structured and open-ended) are commonly used in the publicly funded knowledge transfer literature. In a semi-structured interview, a list of themes and questions is designed which can vary depending on the individual being interviewed. Therefore, a specific context surrounding the issues under investigation can be explored (Saunders et al., 2007). The advantage of an open-ended interview is that the respondents are able to answer questions freely (Ternouth et al., 2012), and for a mostly qualitative study it is important to generate as much detail as possible in the responses. This creates more richness in the data, to provide the basis for a thorough analysis. Furthermore, the interviewers followed the suggestion of Albright et al. (1998) who argued that respondents view the world in unique ways; in this way, the purpose of the interview is to understand experiences and not present them in a standardised form.

In terms of selecting the interview respondents, the final question in the survey asked participants whether they would want to discuss their project in greater detail. 108 participants (from 70 projects) indicated that they would be happy to discuss their project further. In order to generate richness and detail in the responses, interviews from projects with multiple participants were sought. This criterion generated an initial shortlist of 32 projects, which were then ranked based on a range of different factors. This included number of respondents, intervention type, project status, industry classification (SIC Code), company size (employee number), and university partner.

From these 32 projects, a shortlist of 12 was selected. This represented around 10% of the total sample for the KEEN projects. In order to ensure that all university partners were included, three projects from the University of Wolverhampton and three from Coventry University were selected in the sample, alongside two each from BCU and Aston University, as well as a single project each from Staffordshire University and Worcester University.

The projects with interview respondents are shown in Table 9.

Company	Project Status	University	Academic Subject	SIC Code	Staff	Interviewees	Intervention
A	Current	Aston	Business and Marketing	Admin and Support Service Activities	36	3	Business process audit, business process improvement, business plan
B	Completed	WLV	Leisure	Arts, Entertainment and Recreation	60	3	Research and development, market research, market analysis, new product development, product evaluation and testing, marketing
C	Current	Coventry	Media	Information and Communication	2	2	University consultancy and advice, business development and growth, designer specialist-graphics and film after effects, business process improvements
D	Completed	Staffs	Business and Marketing	Manufacturing	50	3	Strategic marketing, market research, marketing communication, business process development
E	Current	WLV	Design	Manufacturing	200	4	Succession planning, business process improvement, CAD
F	Current	Coventry	Engineering	Construction	9	3	Product development, development of prototype product, business process improvement
G	Current	BCU	Business and Marketing	Manufacturing	60	1	Marketing strategy, marketing plan, brand development and positioning, sales and marketing systems, market analysis, new market penetration, website development, marketing communication, project management
H	Current	Coventry	Business and Marketing	Arts, Entertainment and Recreation	117	4	HRM, operations management, project management, logistics planning, business process improvement
I	Current	WLV	Design	Information and Communication	10	3	Research and development, new product development, CAD, product evaluation and testing, marketing communication, customer relationship management, technical support, supply chain management
J	Current	Worcester	Business and Marketing	Manufacturing	6	2	CAD, new product development, business process improvement, marketing communication
K	Current	Aston	Business and Marketing	Information and Communication	11	2	Business process improvement, business plan
L	Current	BCU	Business and Marketing	Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	40	3	Business development and growth, sales and marketing systems, CRM, business plan, market analysis, business process improvement

Table 9: Details of interview respondents

The interviews typically lasted between 30 and 60 minutes and took place in a convenient location for the respondent. If the respondent was not available for a face-to-face meeting then a teleconference through Skype was arranged for the interview.

To complete the interviews, a protocol was designed which was used across each of the respondents. This divided the questions into 12 sections which were:

- Readiness/ Existing Knowledge
- Skills and Training
- Project Management
- Progress
- Relationships/ Culture/ Management Style
- Knowledge Exchange Practice
- University/Business Cooperation
- Unexpected Outcomes
- Innovation
- Sustainability
- Skills Acquired
- Benefits

The questions asked within these sections were broadly similar across all respondent groups. However, the prompts and supplementary questions varied depending on the type of respondent who was participating. This approach ensured that there was commonality between the responses.

4.1.5 Documentary Evidence

The third method of data gathering involved the collection of documentary evidence related to the projects, and indeed documents are a source of data in their own right (Denscombe, 2003). Company data are generally produced to keep records of decisions and provide accountability, either internally or for the purposes of external audit. They are capable of providing a systematic, detailed, transparent, and accurate view of events, situations, decisions, and courses of action. In a KEEN project, the documents that were available are shown in Table 10.

Documents	Description
Application Form	Shows rationale behind the need for KEEN project, company background and financial data, skills required from academic, and job specification
Change Requests	Identifies reasons behind the need for project changes (i.e. duration of project or equipment required)
Project Review Meeting Minutes	Completed for each quarterly review and highlight milestones, risks, and issues which project has faced
Final Reports	Final analysis of project achievements and performance

Table 10: Documentary sources

The documentary evidence was made available through the Business Solutions teams at the partner universities. This evidence formed an important part of the triangulation process as the findings of the surveys and interviews were compared to the evidence presented in the documents.

4.2 Case Study Selection

After the interviews with participants were completed, the next part of the research was to create case studies. With interview material collected from 12 different projects, the research team elected to create six case studies representing a single project from each partner university. In selecting the case studies, the research team utilised a purposive sampling strategy; this is a non-probability approach in which team judgement was applied in the selection of the case studies. The approach is effective when selecting small samples (such as case studies) where the most informative cases are required (Saunders et al*.,* 2007*).* The other criteria which formed part of the sampling frame included intervention type, company size (number of employees), and SIC code.

The projects reflected a range of interventions, with aspects such as strategic marketing, business process reviews, and product design represented amongst the selection. The six case projects covered five different SIC classifications: manufacturing projects (two), wholesale and retail trade (one), information and communication (one), arts, entertainment and recreation (one), and administration and support service activities (one). The companies also represented a range of different sizes, with micro-sized organisations included alongside SMEs with over 40 employees.

Having selected the projects which were the preferred case studies, the research team sought to obtain consent from the senior management of each company to allow its name to be associated with the case study report. As the remainder of this series of reports were deliberately anonymous, in this instance a draft copy of each case study was sent via email to the senior management at each project company requesting both approval to publish and the completion of a consent form. Additionally, each case study company was asked to provide publicity material to illustrate the nature of the business or the project (e.g. logo/ photographs).

When permission was received from each of the case study companies, a copy of the final document was sent to the senior management at each company, and this completed the case study element of the research.

The features of the six case studies are summarised in Table 11.

Company	Project Status	University	Academic Subject	SIC Code	Staff	Interviewees	Interventions
Auctus	Current	Aston	Business and Marketing	Administration and Support Service Activities	36	3	Business process audit, business process improvement, business plan
Grenville	Completed	Staffs	Business and Marketing	Manufacturing	50	3	Strategic marketing, market research, marketing communication, business process development
STM	Current	Coventry	Business and Marketing	Arts, Entertainment and Recreation	117	4	HRM, operations management, project management, logistics planning, business process improvement
IST	Current	WLV	Engineering Design	Information and Communication	10	3	Research and development, new product development, CAD, product evaluation and testing, marketing communication, customer relationship management, technical support, supply chain management
Rack-a-Van	Current	Worcester	Business and Marketing	Manufacturing	6	2	CAD, new product development, business process improvement, marketing communication
Indestructible Paints	Current	BCU	Business and Marketing	Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	40	3	Business development and growth, sales and marketing systems, CRM, business plan, market analysis, business process improvement

Table 11: Details of case study respondents

5.1 Summary

This report has established the chosen methodology for this research study. In addition, the report has also explained how the research team collected the primary data from the survey and interviews.

The key features of the methodology are:

- The utilisation of a mixed method approach
- The execution and analysis of four surveys, one specific to each participant group: academics, affiliates, company supervisors, and university business managers
- The design and execution of an interview protocol
- The collection of documentary evidence, such as meeting minutes and application forms
- The use of case studies to highlight aspects of knowledge exchange arising from the interviews.

This methodology choice has generated a large amount of data to complete the analysis of the knowledge exchange process. The survey returned a response rate of 71% which far exceeds the majority of studies in the topic area. The response was balanced across different universities and type of respondent. Furthermore, interviews with over thirty participants provided the major source of the material to assemble the six case studies.

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